

ABSTRACT OF THE DISCLOSURE

A semiconductor device is produced by forming a gate oxide film on a silicon substrate, forming a gate electrode on the gate oxide film, forming a nitrogen-containing oxide film on the silicon substrate and gate electrode in an N₂O gas or an NO gas, forming a BPSG film on the nitrogen-containing oxide film, and carrying out a reflow process on the BPSG film in a water vapor atmosphere. During the reflow process, the nitrogen-containing oxide film that has no hydrogen atoms prevents the penetration and diffusion of oxygen and hydrogen atoms into the silicon substrate and gate electrode, thereby preventing the 5 oxidization of the silicon substrate and gate electrode. No hydrogen atoms diffuse into the 10 gate oxide film, and therefore, the reliability of the gate oxide film is secured.